

### CLAIMS

What is claimed is:

- 1        1. A crash-bang cartridge assembly, comprising  
2                a tubular cartridge; and  
3                a projectile within said tubular cartridge, said projectile comprising:  
4                        a tubular projectile casing;  
5                        a delay block located at one end of the tubular projectile casing;  
6                        a delay fuse column within said delay block, said delay fuse column being at  
7                                least partially filled with a delay fuse composition;  
8                        a flash charge within said projectile casing, said flash charge being ignited by  
9                                said delay fuse composition; and  
10                        a weighty and frangible ballast located on a leading edge of said projectile, at  
11                                an end of the tubular projectile casing opposite from the end having the  
12                                delay block, wherein a weight of said ballast is sufficient to provide  
13                                stability and accuracy in flight, and wherein an at least one material  
14                                comprising the weighty and frangible ballast is sufficiently frangible that,  
15                                after detonation of said flash charge, the at least one material comprises  
16                                low mass, low energy components.
- 1        2. The crash-bang cartridge assembly of claim 1, wherein the low mass, low energy  
2 components comprising the weighty and frangible ballast after detonation are less likely to cause  
3 injury to any creature in a vicinity of said detonation.
- 1        3. The crash-bang cartridge assembly of claim 1, wherein the at least one material  
2 comprising the weighty and frangible ballast comprises at least one of a solid and a liquid.
- 1        4. The crash-bang cartridge assembly of claim 1, wherein the delay fuse composition is  
2 consolidated.

1           5. The crash-bang cartridge assembly of claim 1, wherein the at least one material  
2 comprising the weighty and frangible ballast is consolidated.

1           6. The crash-bang cartridge assembly of claim 5, wherein the at least one material  
2 comprising the weighty and frangible ballast remains substantially within the end of the tubular  
3 projectile casing by means of said consolidation.

1           7. The crash-bang cartridge assembly of claim 1, wherein the at least one material  
2 comprising the weighty and frangible ballast comprises metallic particles.

1           8. The crash-bang cartridge assembly of claim 7, wherein the metallic particles form a  
2 metallic powder.

1           9. The crash-bang cartridge assembly of claim 7, wherein the tubular projectile casing  
2 forms a cup and the end of the tubular projectile casing where the weighty and frangible ballast is  
3 located forms a solid end of the cup, and wherein the metallic particles comprising the weighty and  
4 frangible ballast is consolidated at said solid end of the cup by pressing a ram over the metallic  
5 particles.

1           10. The crash-bang cartridge assembly of claim 7, wherein the weighty and frangible ballast  
2 is secured at the end of the tubular projectile casing by a wad.

1           11. The crash-bang cartridge assembly of claim 7, wherein the tubular projectile casing  
2 comprises a cardboard tube, and wherein the end of the tubular projectile casing where the weighty  
3 and frangible ballast is located is sealed by an upper closure wad and the weighty and frangible  
4 ballast is sealed in by a lower closure wad in an inside portion of the tubular projectile casing.

1           12. The crash-bang cartridge assembly of claim 1, wherein the at least one material  
2 comprising the weighty and frangible ballast comprises at least one of zinc particles, lead particles,  
3 graphite particles, and tungsten particles.

1           13. The crash-bang cartridge assembly of claim 1, wherein the at least one material  
2 comprising the weighty and frangible ballast comprises a mixture of zinc powder and graphite  
3 powder.

1           14. The crash-bang cartridge assembly of claim 13, wherein the graphite powder in the  
2 mixture of zinc and graphite powder coats the zinc particles comprising the zinc powder in said  
3 mixture and prevents said zinc particles from bonding too closely together.

1           15. The crash-bang cartridge assembly of claim 13, wherein the ratio of zinc powder to  
2 graphite powder controls a degree of frangibility of the weighty and frangible ballast.

1           16. The crash-bang cartridge assembly of claim 1, wherein the at least one material  
2 comprising the weighty and frangible ballast comprises a liquid.

1           17. The crash-bang cartridge assembly of claim 16, wherein the liquid comprising the at  
2 least one material comprises methylene chloride.

1           18. The crash-bang cartridge assembly of claim 1, wherein the projectile further comprises:  
2               a container for the at least one material comprising the weighty and frangible ballast.

1           19. The crash-bang cartridge assembly of claim 18, wherein the container is comprised of  
2 nylon.

1           20. The crash-bang cartridge assembly of claim 1, wherein the tubular projectile casing  
2 comprises at least one of aluminum, plastic, rubber, and cardboard.

1       21. The crash-bang cartridge assembly of claim 1, wherein the projectile further comprises:  
2             an obturator formed on an outer circumference of the tubular projectile casing.

1       22. The crash-bang cartridge assembly of claim 1, wherein the projectile further comprises:  
2             an igniter located at an end of the delay fuse composition and in proximity to the flash  
3             charge, said igniter is comprised of igniter composition, wherein said igniter is  
4             ignited by the delay fuse composition, and, in turn, ignites the flash charge.

1       23. The crash-bang cartridge assembly of claim 1, further comprising:  
2             a primer at one end of said tubular cartridge;  
3             propellant in said tubular cartridge for launching the projectile from said tubular  
4             cartridge, said propellant being ignited by said primer; and  
5             a pressure wad between said propellant and said projectile.

1       24. The crash-bang cartridge assembly of claim 22, wherein an end of the tubular cartridge  
2       opposite from said end of the tubular cartridge having the primer is crimped inward to seal the  
3       projectile within the tubular cartridge.

1       25. The crash-bang cartridge assembly of claim 23, further comprising:  
2             a closure wad sealing the projectile within the tubular cartridge, wherein said crimping  
3             at least assists in keeping said closure wad in place.

1       26. A crash-bang projectile, said crash-bang projectile fitting within a crash-bang cartridge in  
2       order to form a crash-bang cartridge assembly, comprising  
3             a tubular projectile casing;  
4             a flash charge within said tubular projectile casing; and  
5             a weighty and frangible ballast located on a leading edge of said crash-bang projectile,  
6             wherein a weight of said ballast is sufficient to provide stability and accuracy in  
7             flight, and wherein an at least one material comprising the weighty and frangible  
8             ballast is sufficiently frangible that, after detonation of said flash charge, the at least  
9             one material comprises low mass, low energy components.

1           27. A method of manufacturing a crash-bang cartridge assembly, said crash-bang cartridge  
2 assembly comprising a tubular cartridge and a projectile within said tubular cartridge, said method  
3 comprising the steps of:

4                 forming a tubular projectile casing;  
5                 placing a delay block at one end of the tubular projectile casing, wherein a delay fuse  
6                         column is within said delay block, and said delay fuse column is at least partially  
7                         filled with a delay fuse composition;  
8                 placing a flash charge within said projectile casing; and  
9                 placing a weighty and frangible ballast on a leading edge of said projectile, at an end of  
10                         the tubular projectile casing opposite from the end having the delay block, wherein  
11                         a weight of said ballast is sufficient to provide stability and accuracy in flight, and  
12                         wherein an at least one material comprising the weighty and frangible ballast is  
13                         sufficiently frangible that, after detonation of said flash charge, the at least one  
14                         material comprises low mass, low energy components.

1           28. The method of claim 27, further comprising the step of:  
2                 consolidating the delay fuse composition within the delay block.

1           29. The method of claim 27, further comprising the step of:  
2                 consolidating the at least one material comprising the weighty and frangible ballast  
3                         inside the tubular projectile casing.

1           30. The method of claim 29, wherein the at least one material comprising the weighty and  
2 frangible ballast remains substantially in place in the end of the tubular projectile casing by means of  
3 said consolidation.

1           31. The method of claim 29, wherein the tubular projectile casing forms a cup and the end of  
2 the tubular projectile casing where the weighty and frangible ballast is located forms a solid end of  
3 the cup, and wherein said step of consolidating the at least one material comprising the weighty and  
4 frangible ballast comprises the step of:

5                       consolidating the at least one material comprising the weighty and frangible ballast at  
6                       said solid end of the cup by pressing a ram over the at least one material.

1           32. The method of claim 27, further comprising the step of:  
2                       securing the weighty and frangible ballast at the end of the tubular projectile casing  
3                       with a wad.

1           33. The method of claim 27, wherein the tubular projectile casing comprises a cardboard  
2 tube, the method further comprising the steps of:  
3                       sealing the end of the tubular projectile casing where the weighty and frangible  
4                       ballast is located with an upper closure wad; and  
5                       sealing the weighty and frangible ballast in with a lower closure wad in an inside  
6                       portion of the tubular projectile casing.

1           34. The method of claim 27, further comprising the step of:  
2                       controlling a degree of frangibility of the weighty and frangible ballast by adjusting  
3                       components comprising the weighty and frangible ballast.

1           35. The method of claim 27, further comprising the step of:  
2                       at least one of forming and placing an obturator on an outer circumference of the  
3                       tubular projectile casing.

- 1        36. The method of claim 27, further comprising the steps of:  
2                placing a primer at one end of said tubular cartridge;  
3                placing propellant in said tubular cartridge; and  
4                placing a pressure wad between said propellant and the projectile.
- 1        37. The method of claim 36, further comprising the step of:  
2                crimping an end of the tubular cartridge opposite from said end of the tubular  
3                cartridge having the primer inward to seal the projectile within the tubular  
4                cartridge.
- 1        38. The method of claim 37, further comprising the step of:  
2                placing a closure wad at the end of the tubular cartridge opposite from the primer in  
3                order to seal the projectile within the tubular cartridge, wherein said step of  
4                crimping at least assists in keeping said closure wad in place.